

REMARKS

Claims 31-64 are pending.

Reconsideration of the application is respectfully requested for the following reasons.

In the Office Action, the Examiner rejected claims 1, 3, 7, 8, and 10-12 under 35 USC § 102(b) for being anticipated by the Otsuka 407 patent, and rejected claims 1, 8, 9, 10, 13, 14, 29, and 30 under 35 USC § 103(a) based on a combination of the Otsuka 330 and 407 patents. In addition, claims 4 and 5 were rejected under 35 USC § 103(a) for being obvious in view of a combination of the Otsuka patents and the Schaper patent. The original claims have been canceled, thereby rendering these rejections moot. Applicants further submit that new claims 31-64 are allowable over the cited references for at least the following reasons.

I. Claims 31-55 and 64.

Claim 31 recites a first set of signal wires distributed among at least first and second adjacent layers, and a second set of signal wires distributed among at least the first and second layers. This claim further recites “the first and second sets having a different number of signal wires” (e.g., see Figure 5A for support), with the signal wires in the first set being substantially parallel and arranged in a first pattern and the signal wires in the second set being substantially parallel and arranged in a second pattern.

The Otsuka 407 patent does not teach or suggest these features. This patent discloses a plurality of signal lines distributed among adjacent layers in an alternating pattern. These lines are arranged in sets, with a first set formed from sense line pair A and

/A and data line pair A and /A and a second set formed from sense line pair B and /B and data line pair B and /B. (See Figure 10B). Unlike the claimed invention, the first and second sets have a same number of signal lines.

This is a necessary feature of the Otsuka 407 circuit, i.e., the Otsuka circuit is a memory (SRAM) having data line pairs and sense line pairs. Because each set is formed from one pair of data lines and one pair of sense lines, each group has the same number of lines, as shown in Figure 10B. Accordingly, the Otsuka patent does not teach or suggest “the first and second sets having a different number of signal wires” and thus does not teach or suggest the invention defined in claim 31.

The Otsuka 330 patent also does not teach or suggest this invention. The Otsuka 330 patent discloses a wiring substrate for carrying signals to or from a memory or processing circuit. As shown in Figure 8, the substrate includes a plurality of signal wires 75 and 76 arranged in different layers. (These signal wires are also alleged to correspond to wires 34 and 36 in respective layers 35 and 38 in Fig. 4D). Unlike the claimed invention, these signal wires are not distributed in first and second sets, with the first and second sets having a different number of signal wires distributed among at least two adjacent layers in first and second patterns. The Otsuka 330 patent, therefore, fails to teach or suggest the invention of claim 31, whether taken alone or in combination with the Otsuka 407 patent.

The Schaper patent was cited for its disclosure of power connection and ground pads. However, Schaper does not teach or suggest the features of claim 31 missing from the Otsuka patents.

For at least the foregoing reasons, it is respectfully submitted that claim 31 and its dependent claims are allowable over a combination of the Otsuka and Schaper patents.

Claim 32 recites that "each of the first and second sets have an even number of signal lines." These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 33 recites that "the first layer has a number of signal wires from the first and second sets different from a number of signal wires from the first and second sets in the second layer." These features are not taught or suggested by the Otsuka and Schaper patents.

Claim 35 recites that "the first pattern is different from the second pattern." All the patterns shown in the Otsuka patents are in the same pattern. It is therefore submitted that claim 35 is allowable for these additional reasons.

Claim 36 recites that "the first and second patterns are alternating patterns." The Otsuka 407 shows an alternating pattern in Figure 10B, but differs from base claim 31 for the reasons previously indicated. As for Otsuka 330, the Examiner indicated that this reference may be modified so that signal lines 75 and 76 are in alternating pattern. But, Otsuka 330 makes clear that signal lines 75 and 75 must be arranged in an opposing and overlapping relationship to one another, otherwise the circuit will not function properly. See column 16, lines 36-49, and column 17-20 and claim 3 which disclose formulas which the signal lines must adhere to in terms of their opposing relationship in order to ensure proper functioning.

Because of these requirements, it is respectfully submitted that any modification of Otsuka 330 to place signal lines 75 and 76 in an alternating pattern relative to one another would result in rendering this patent inoperative or unsatisfactory for its intended purpose, which is impermissible under MPEP § 2143 et seq.

Claim 64 is allowable for similar reasons.

Claim 37 recites that “the number of signal wires in the first layer of the first set is different from the number of signal wires in the first layer of the second set.” These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 38 recites that “the signal wires in the first set are distributed in an alternating pattern among the first and second layers, and the signal wires in the second set are distributed in an aligned pattern among the first and second layers.” (Emphasis added). These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 39 recites that “the first and second layers are adjoining layers.” These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination. In fact, Fig. 4D of Otsuka 330 shows that at least one dielectric layer is formed between the signal wires.

Claim 40 recites that “the signal wires in at least one of the first and second sets are distributed among the first and second layers and at least a third layer adjacent the first and second layers.” These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 41 recites that “the first, second, and third layers are adjoining layers.” These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 42 recites that “the signal wires in the first and second sets are distributed among the first and second layers and at least a third layer adjacent the first and second layers.” These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 43 recites that “the signal wires in the first and second sets are distributed in a same type of pattern among the first, second, and third layers.” These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 44 recites that “the same type of pattern is an alternating pattern.” These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 45 recites that “the signal wires in the first and second sets are distributed in different patterns among the first, second, and third layers.” These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 46 recites that “the different patterns are different alternating patterns.” These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 47 recites that “the first, second, and third layers are adjoining layers.” These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 48 recites that "the signal wires in the first layer are local interconnect wires and signal wires in the second layer are global routing wires." These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 49 recites that "the signal wires in the first set have a same permittivity and the signal wires in the second set have a same permittivity." These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 50 that "the first set of signal wires is separated from the second set of signal wires." These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 51 recites that "the first set of signal wires is separated from the second set of signal wires by one or more ground or return wires." These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 52 recites that "the first set of signal wires is separated from the second set of signal wires by ground or return wires in the first and second layers." These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 53 recites that "the first set of signal wires is located between the one or more ground or return wires and one or more power supply wires." These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 54 recites that “the second set of signal wires is located between the one or more ground or return wires and one or more additional power supply lines.” These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 55 recites that “the signal wires from the first and second sets located in the first layer are between first and second power supply lines in the first layer.” These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 56 recites that “the signal wires from the first and second sets that are located in the second layer are between third and fourth power supply lines in the second layer.” These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

II. Claims 57- 60.

Claim 57 recites a semiconductor device having first and second sets of signal wires distributed among at least first and second adjacent layers. This claim further recites that “the signal wires in the first set being substantially parallel in a first direction, the signal wires in the second set of the first layer being substantially parallel in the first direction, and the signal wires in the second set of the second layer being in a second direction different from the first direction.” (See, e.g., Figure 5C for support). These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination. For example, all the signal lines shown in the Otsuka patents are parallel to one another, i.e., they are not arranged in first and second directions in the manner recited in claim 57.

Claim 58 recites that “the first and second directions are at least substantially orthogonal directions.” These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 59 recites that “the first and second sets have a different number of signal wires.” These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

Claim 60 recites that “the signal wires in the second set of the second layer are located in an area free from frequency limiting paths.” These features are not taught or suggested by the Otsuka and Schaper patents, whether taken alone or in combination.

III. Claims 61-63.

Claim 61 recites features similar to those which patentably distinguishes claim 31 from the cited references. It is therefore submitted that claim 61 is allowable, and that dependent claims 62 and 63 are allowable not only by virtue of their dependency from claim 61 but also based on the features separately recited therein which are not taught or suggested by the cited references, whether taken alone or in combination.

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. Favorable consideration and prompt allowance of the application is respectfully requested.

To the extent necessary, Applicants petition for an extension of time under 37 CFR § 1.136. Please charge any shortage in fees due in connection with this application to

Deposit Account No. 16-0607 and credit any excess fees to the same Deposit Account.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Mark L. Fleshner', is written over a horizontal line.

Attorneys for Intel Corporation

Mark L. Fleshner
Registration No. 34,596
Samuel W. Ntiros
Registration No. 39,318

FLESHNER & KIM, LLP
P.O. Box 221200
Chantilly, Virginia 20153-1200
Telephone No: (703) 766-3701
Facsimile No: (703) 766-3644
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MLF/SWN:tlg